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Date In: August 20, 2018

Customer:

TUFF Industries
9570 Bottom Wood Lake Road
Lake Country, BC V4V 1S7
Canada

Purchase Order Number: 315188

A. TEST OBJECTIVE:

Abrasion testing of submitted material

B. TEST ITEM(S):

One (1) material

C. SPECIFICATIONS / METHODS / TECHNIQUES:

1. ASTM D1242-95a Standard Test Methods for Resistance of Plastic Materials to Abrasion

D. RESULTS:

The sample met the stated requirements.

TESTING PERFORMED BY:

Handwritten signature of Daniel D. Phillips in blue ink.

Daniel D. Phillips
Department Manager - FA/Analytical

Handwritten signature of Scott L. DeBow in blue ink.

Scott L. DeBow
Senior Analyst

TECHNICAL/QUALITY APPROVALS:

Handwritten signature of Katherine C. Higgs in blue ink.

Katherine C. Higgs
Special Projects Manager



TEST ITEM IDENTIFICATION

SAMPLE TYPE	Decking Membrane
NUMBER OF SAMPLES SUBMITTED	One (1) material
SAMPLE IDENTIFICATION	Tufdek/50627
SAMPLE DISPOSITION	To be returned to TUFF Industries

See a representative image of the as-received material within the body of the test report.

ABRASION

REFERENCE	ASTM D1242-95a, Method A
TEST SPECIMENS	Three (3) replicates of the submitted material
REQUIREMENT	From ICC-ES Acceptance Criteria AC39, paragraph 4.1.6 (provided by TUFF Industries) – The reduction in average thickness in mils (mm) and percent reduction for each specimen should be reported. The maximum loss in thickness shall not exceed 40 mils (1.02 mm).
SUMMARY	The material meets the stated requirement.
SAMPLE PREPARATION DETAILS	The test specimens were cut to 2"x 3" and individually attached to metal coupons via a quick-setting epoxy. The samples were kept in laboratory ambient conditions (23±2°C / 50±5%RH) for at least forty (40) hours prior to testing.
SAMPLE PREPARATION PERFORMED BY	SD
PREPARATION DATE	September 17, 2018
TEST MODIFICATIONS	Per AC39, the load was adjusted to 1,000 grams
TEST CONDITIONS	Laboratory Ambient
TEST PERFORMED BY	SD/DP
TEST DATE	September 20-21, 2018
EQUIPMENT USED	WC051768, WC051864

RESULTS:

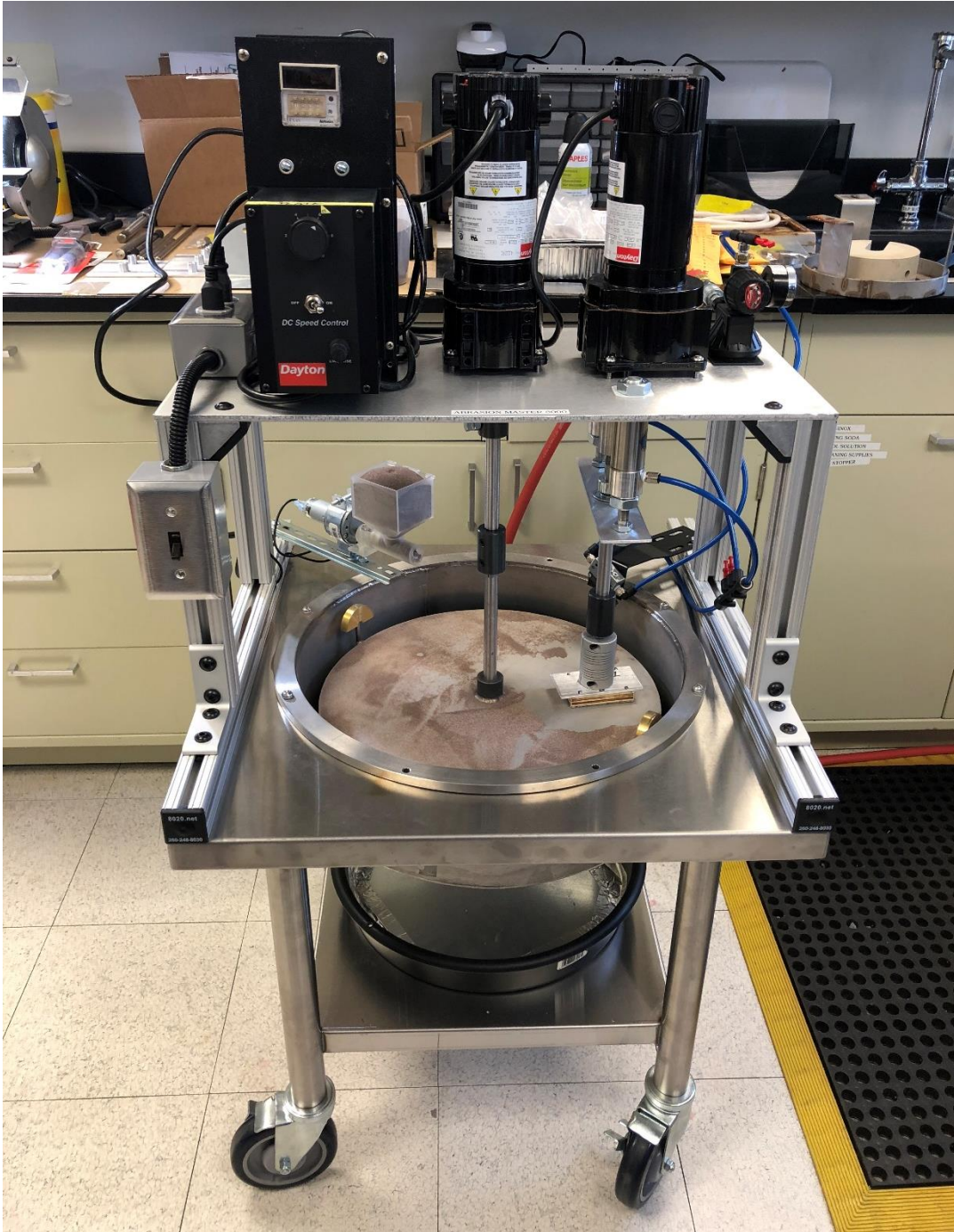
Three (3) specimens were abraded for 1,000 revolutions under a 1,000 gram load with an aluminum oxide grit No. 80TP. Upon completion of the exposure, the reduction in average thickness (mils) was determined.

Thickness measurements were obtained by taking five (5) total measurements – one (1) on each corner of the prepared specimen, and one (1) in the “center” of the specimen. These five (5) values were then averaged for the total specimen thickness. A “blank” sample was measured by obtaining five (5) thickness measurements at “random” locations.

These results are summarized in the following table:

Reduction in Thickness from Abrasion		
Specimen	Loss in Thickness (mils)	% Reduction
1	3.13	5.4
2	1.92	3.3
3	2.64	4.6
AVERAGE	2.56	4.4

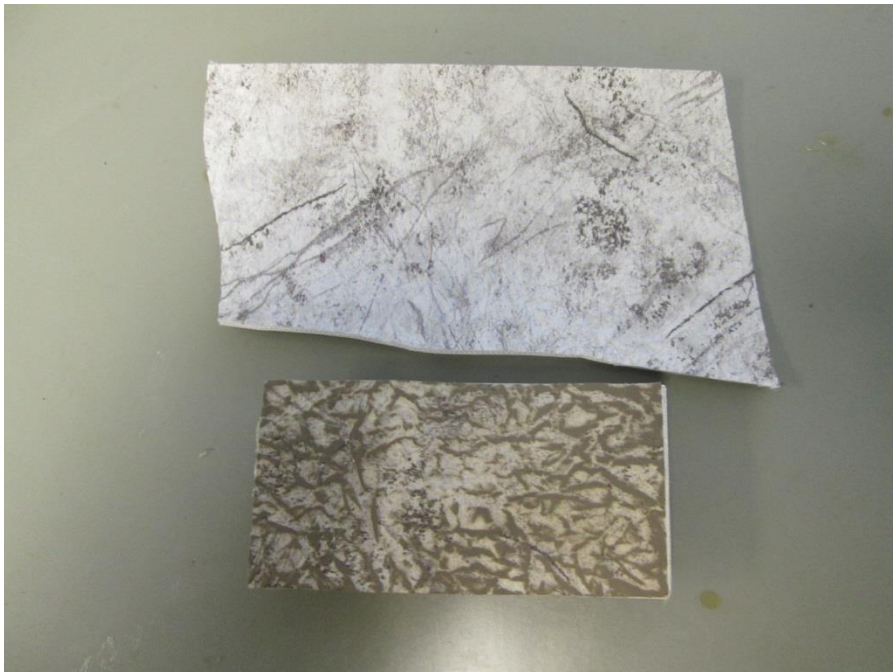
Test images are provided below.



**Overview Image of Abrasion Tester
(Image taken from a previous project)**



Representative Close-up of Sample in Abrasion Tester



Representative Close-up of Material As-received (top) and Post-abrasion (bottom)



EQUIPMENT LIST

ID	Manufacturer	Equipment Name	Model Number	Serial Number	Calibration Date	Calibration Due Date
WC051783	Control Company	Digital Caliper	62379-531	160527136	18-Jul-2018	31-Jul-2019
WC051864	NTS	Abrasion Tester	ASTM D1242	N/A	N/A	N/A



TEST METHODS:

ABRASION

The testing was performed in accordance with ASTM D1242-95a Standard Test Methods for Resistance of Plastic Materials to Abrasion (Withdrawn 2004).

Three (3) specimens were tested in accordance to Method A for a period of 1,000 revolutions under a 1,000-gram load with an aluminum oxide grit No. 80TP abradent or equivalent. The reduction in average thickness in mils (mm) and percent reduction for each specimen was reported. Acceptable specimens shall not exceed 40 mils (1.02 mm) of thickness loss.



REVISION HISTORY

Revision	Revision date	Reason
1	September 24, 2018	<ul style="list-style-type: none"><li data-bbox="824 384 1403 409">• Changed sample identification on page 2



END OF REPORT